

~~25~~ 25. (Amended) The method of claim [1] 31, wherein the steps of conditioning and compressing are both performed in a substantially [the same] similar environment of saturated steam [environment].

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26. (Amended) The method of claim [3]31, wherein said [environment] steam environment for conditioning and compression is at a saturation pressure corresponding to a temperature no greater than about 120 deg. C and the steps of preheating and conveying the destructured material are performed at a saturation pressure corresponding to a temperature greater than about 120 deg. C.

~~29~~ 29. (Amended) A method for producing thermo-mechanical pulp from lignocellulose fiber-containing feed material comprising the steps of:

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first conditioning said fiber containing feed material in an environment of saturated steam at a pressure in the range of about 15 - 25 psi to produce a conditioned feed material;

subsequently compressing said conditioned feed material in a screw press in an environment of saturated steam at a pressure in the range of about 15 - 25 psi at a compression ratio of at least about 4:1 to destructure said fibers; and

without an intervening chemical digester, finally refining said material to form lignocellulose pulp.

~~31~~ 31. A method for producing thermo-mechanical pulp in a primary disc refiner from lignocellulose fiber-containing feed material comprising the steps of:

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first conditioning said fiber containing feed material in an environment of steam at an elevated pressure in the range of 10 - 100 psi to produce a conditioned feed material at a temperature in the range of about 90 - 120 deg. C;

directly thereafter compressing said conditioned feed material in an environment of steam at an elevated pressure in the range of about 10 - 100 psi to destructure said fibers at a temperature in the range of about 90- 120 deg. C without significant breakage across grain boundaries;

preheating the destructured material in an environment of saturated steam at a pressure higher than the pressure of the environment at which the material was

p. 3 15-25 psi
90-120°C
p. 4 kraft 120-150°C
25-150°C

destructured; and

conveying the preheated material to the inlet of a primary disc refiner operating at a pressure higher than the pressure of the environment at which the material was destructured. ~~_____ 2~~

32. The method of claim 27, wherein said conditioning of said feed material is performed at a pressure in the range of about 15 - 25 psi and said compression is performed in a compression screw device in the range of from 4:1 to 8:1 of the non-compressed volume of said conditioned feed material.

sbHb 33. The method of claim 31, wherein the conditioning of said feed material is performed for a period of time in the range of 3 - 60 seconds. ✓

34. The method of claim 31 wherein said step of compressing said conditioned feed material is performed in a variable speed compression screw device in the range of from 4:1 to 8:1 of the non-compressed volume of said conditioned feed material.

35. The method of claim 34, wherein the conditioning of said feed material is performed for a period of time in the range of 3 - 60 seconds.

sbC3 36. A method for producing thermo-mechanical pulp in a primary disc refiner from lignocellulose fiber-containing feed material comprising the steps of:

first conditioning said fiber containing feed material in an environment of steam at an elevated pressure in the range of 10 - 100 psi to produce a conditioned feed material at a temperature in the range of about 90 - 120 deg. C; 90-120 25.

2, directly thereafter compressing said conditioned feed material in an environment of steam at an elevated pressure in the range of about 10 - 100 psi to destructure said fibers at a temperature in the range of about 90- 120 deg. C without significant breakage across grain boundaries;

preheating the destructured material in an environment of saturated steam at a pressure above the glass transition temperature of the lignin in the material, for a period